

ACCELERATED SITE TECHNOLOGY DEPLOYMENT

Fact Sheet

Deploying A Robot Work Platform for Large Hot Cell Deactivation

Hanford Site (November 2000 update)

In Partnership with the Office of Science & Technology

Introduction

The 324 Building, located at the Hanford Site near Richland, Washington, is being deactivated to meet State and Federal clean-up commitments. The 324 Building has highly radioactive tanks, tank vaults, piping, and large hot cells containing complex radiochemical processing equipment. To meet clean-up commitments there is a need to deploy more rapid and remote size-reduction, debris collection and removal, characterization, and decontamination methods. Readily deployable deactivation methods that reduce worker exposure, secondary waste generation, costs, and risks are also needed. Deployment of a remote/robot work platform in the 324 Cells with full reach capabilities will significantly accelerate work tasks, eliminate the need for multiple specialized tool design and procurement, and reduce the overall program risks.

To address the site's needs, DOE's Office of Science and Technology (EM-50) has partnered with Hanford in an Accelerated Site Technology Deployment (ASTD) project. EM-50 provided funding for deployment of the robot work platform to support 324 clean-up activities. Through this project, Hanford will procure and deploy a remote/robot work platform that is positioned with an overhead crane to perform myriad deactivation activities.

Technical Need

A remote/robot work platform that can perform deactivation tasks in a highly radioactive environment is required. Tasks include: metal cutting, debris retrieval and packaging, small equipment relocation, floor cleaning, visual inspection, characterization, non destructive examination, and decontamination activities. Use of this work platform will reduce worker exposure and programmatic risk, and provide project cost and schedule savings.

Baseline technologies in the 324 Building include: overhead cranes and mechanical master-slave manipulator systems. These baseline technologies are highly inefficient for deactivation activities, and cannot access all areas of the hot cells; this hampers equipment removal and decontamination activities. Special tools must be

designed and procured for the crane and manipulators, which are limited in their capability to access the cell floor, ceiling, and corner areas. Visibility is limited by viewing through four- foot thick lead glass windows and in-cell video cameras.

System Description

The system being procured is a mast mounted, manipulator work platform. A manipulator is mounted to the work platform, which travels on the mast. The mast is 5 meters tall and the manipulator has a 2 meter reach.



Mast Mounted Manipulator Work Platform

The manipulator can handle 90+ kg (200 lbs.) at full extension. The work platform can also be deployed on special stands for work in such areas as below floor-level pits and pipe trenches.

The work platform has sufficient length and dexterity to allow end effectors to reach all interior surfaces of a hot cell including the ceiling. It is designed to operate with a variety of tool devices that will be used for hot cell



equipment/debris removal in addition to other deactivation operations. The device must demonstrate high reliability in radiation fields under a variety of control modes. The system is modular and easily repairable. The system can deploy a variety of end effectors such as shears, cutoff saws, decontamination spray heads and detectors for characterization and non-destructive examination.

The assembly will have access to all regions of the most challenging hot cell (B-Cell) as well as the flexibility to be deployed in other areas in the 324 building such as the Airlock Pipe Trench and the Shielded Materials Facility (SMF).

The remote/robot work platform utilizes on-board lights and video, providing visual access control in all areas of the hot cells.

Benefits

Use of the remote/robot platform will reduce the work time associated with manipulator change-out and repair, installation and removal of special tooling, and final cell cleaning. The result will be shorter clean-up schedules and reduced program costs.

The platform's ability to access areas beyond current manipulators' reach will greatly improve accessibility to all areas of the cell. The system's remote operation capability will allow it to work in high radiation areas and its access to all parts of the airlock will significantly reduce the number of manned airlock entries (twenty plus personnel involved in each entry). The overall result is a reduction of radiation dose to workers.

The remote/robot work platform in hot cells will reduce manipulator maintenance work by an estimated 50%. This will result in a significant savings derived from the reduced effort involved with the removal, installation, and maintenance of the mechanical manipulators.

Status (November 2000)

The procurement bid cycle, which included proposals submitted by nine qualified vendors, is complete. Based on extensive interviews with the companies, field visits,

and price evaluation, the contract was awarded to Cybernetix in February 2000.

Final assembly of the work platform at the factory is complete and integrated system checkouts are in progress. Factory acceptance testing will begin in February 2001 and the robot will be shipped to the site in March. Training of Operators, Maintenance Crafts and Engineers will take place in April.

At the present time, Hanford Site representatives and regulatory authorities are engaged in an active dialog with respect to the 324 facility cleanout schedule and milestones. The remote/robotic work platform will be deployed in the facility as opportunities avail themselves; the exact timing must be consistent with Tri-Party Agreement milestones. "Hot" deployment (initial) of the system is anticipated during the 4th quarter of FY01.

The overall cost for the assembly is just under \$1.1 million as projected in the original Deployment Plan. Overall project cost savings are projected to be greater than \$3.0 million.

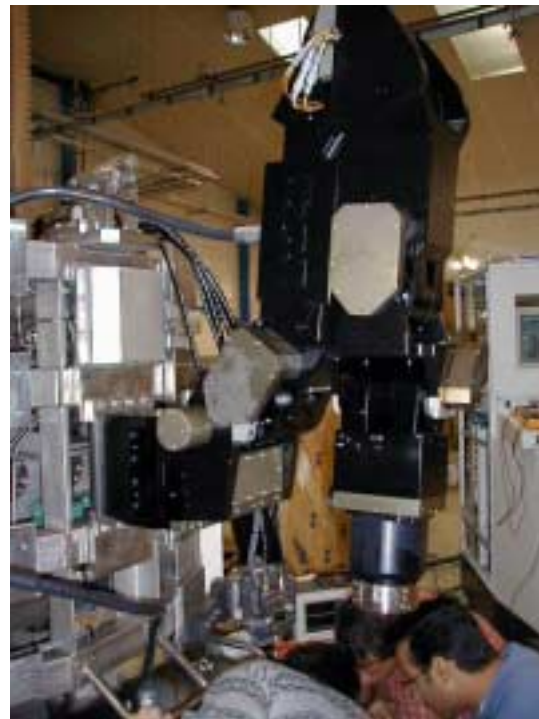


Photo of the Work Platform taken in Nov 2000

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